THE PLANT DISEASE REPORTER

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The Plant Disease Reporter is issued as a service to plant pathologists throughout the United States. It contains reports, summaries, observations, and comments submitted voluntarily by qualified observers. The reports often are in the form of suggestions, queries, and opinions, frequently purely tentative, offered for consideration or discussion rather than as matters of established fact. In accepting and publishing this material the Division of Mycology and Disease Survey serves merely as an informational clearing house. It does not assume responsibility for the subject matter.

IN THIS ISSUE

Check list revision, by Freeman Weiss, page - 186.

Spread of white pine blister rust during 1944 is reported by J. F. Martin, page - 194.

E. M. Hildebrand discusses transmission of woody plant viruses by dodder, page - 196.

Condition of fruits and vegetables arriving at New York City piers is described by Robert C. Cassell, page - 198.

Ian W. Tervet reports potato storage troubles in South Dakota, page - 200.

Tobacco downy mildew was first observed in Georgia this season shortly after the middle of February, according to George G. Gaines, page - 201. Douglas C. Bain reports on tobacco seedling diseases in Louisiana; and E. W. Bodine on sugar beet diseases in the Imperial Valley of California.

Pea diseases observed in the Imperial Valley during surveys in the 1943-1944 and 1944-1945 winter seasons are reported by William C. Snyder, John T. Middleton, and E. W. Bodine, page - 202.

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U. S. DEPARTMENT OF AGRICULTURE

CHECK LIST REVISION

Freeman Weiss

FESTUCA (GRAMINEAE)

FESTUCA ARIZONICA Vasey, ARIZONA FESCUE, MOUNTAIN BUNCHGRASS, (1); F. IDAHOENSIS Elmer, IDAHO F., BLUE B. (2); F. SCABRELLA Torr., ROUGH F. (3); F. THURBERI Vasey, THURBER F. (4); F. VIRIDULA Vasey, GREEN F., GREEN MOUNTAIN B. (5). Perennial, tuft-forming grasses occurring at medium to high elevations in mountain meadows, open slopes, or sometimes thin woods of the Western States; all valuable for grazing, especially (2) and (5). The distribution varies with each sp., 1 being southern, 3 and 5 in the northwest, 4 central, and 2 throughout.

Cercosporella herpotrichoides Fron, foot rot. Ida., Oreg., Wash. (2).
Claviceps purpurea (Fr.) Tul., ergot. Ida. (2).
Curvularia spiciferum (Bainier) Boed., leaf mold. Wash. (2).
Erysiphe graminis DC., powdery mildew. Wash. (2).
Mycosphaerella tulasnei Jacz. (? Cladosporium herbarum Pers. ex Lk.), leaf mold. Wash. (2).
Phyllachora silvatica Sacc. & Speg., tar spot. Calif. (2).
Puccinia cockerelliana Bethel (II, III), rust. Colo. (4), Oreg. (3), Wash. (3). 0 and I on Thalictrum fendleri Engelm.
P. coronata Cda. (II, III), crown rust. Colo., Wash. (2).
P. crandallii Pam. & Hume (II, III), rust. Colo. (2), Ida. (2), Mont. (2), Oreg. (2, 3), Wash. (2, 5), Wyo. (2). 0 and I on Symphoricarpos spp.
P. graminis Pers. (II, III), stem rust. Colo. (1), Mich. (2), Oreg. (2), Wash. (2). The var. phlei-pratensis (Eriks. & Henn.) Stakman & Piemeisel identified.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. N. Dak. (3).
Selenophoma donacis (Pass.) Sprague & A. G. Johns. var., speckle. Wash. (2).
Septoria tenella Cke. & Ell., leaf spot. Wyo. (2).
Ustilago sp., smut. Colo. (5).
U. bullata Berk., head smut. Wash. (2).

Bends - cause unknown. Wash. (2, 4), Wyo. (2).

FESTUCA ELATIOR L., MEADOW FESCUE (1). Perennial, turf-forming grass of Eurasia, cult. for forage and hay, and escaped throughout temperate N. America. Including the var. ARUNDINACEA (Schreb.) Wimm. (2), a more robust form.

Aphanomyces sp., root rot. N. Dak. (1).
Cercospora sp., leaf spot. Ky. (2).
Claviceps purpurea (Fr.) Tul., ergot. Me. to Va., Okla. and Wash. (1); Ky., Oreg. (2).

FESTUCA ELATIOR L. cont.

Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Ky., Minn., N. Y., Okla., Pa. (1).

Epicoccum sp., leaf spot. Ky. (1, 2).

Fusarium scirpi C. R. Lambert & Fautr. var. acuminatum (Ell. & Ev.) Wr., secondary root rot. N. Dak. (1).

Helminthosporium dictyoides Drechs., net blotch. Me. to Va., Iowa and Mich. (1). Hardison has reported (2) as largely resistant in Kentucky.

H. sativum Pam. King & Bakke, leaf spot. Iowa (1).

Heterodera marioni (Cornu) Goodey, root knot.

Ophiobolus graminis Sacc., root and stem rot. Ark. (1).

Phyllachora graminis (Pers. ex Fr.) Fckl., tar spot. Me., R. I. (1).

Puccinia coronata Cda. (II, III), crown rust. General (1). It has been noted by Piper and by Hardison that (2) is usually resistant.

P. graminis Pers. (II, III), stem rust. General (1); Ky., Wash. (2). The var. phlei-pratensis (Eriks. & Henn.) Stakman & Piemeisel has been identified widely.

P. piperi Ricker (II, III), rust. Utah. (1). O and I unknown.

P. poae-sudeticae (West.) Jørst. (II, III), rust. Oreg. (1). O and I unknown.

P. rubigo-vera (DC.) Wint. (II, III), leaf rust. N. Dak., Vt. (1).

Pythium arrhenomanes Drechs., root browning. N. Dak. (1, 2).

P. debaryanum Hesse and P. irregulare Buis., damping-off. N. Dak. (1, 2).

Scolecotrichum graminis Fckl., brown stripe. Kans. (1).

Selenophoma donacis (Pass.) Sprague & A. G. Johns., speckle. Calif. (1).

Septoria festucina Tehon & Daniels, leaf spot. Ill. (1).

Bends - cause unknown. Mich. (1); Ky., Wash. (1, 2).

FESTUCA OCTOFLORA Walt., SIX-WEEKS FESCUE (1). Annual, growing typically in waste ground throughout the U. S.; furnishes food for wildlife. A few records on F. MYUROS L. (2), intr. from Europe and established in Atlantic and Pacific coastal areas, and on F. PACIFICA Piper (3), in the Pacific Coast and Intermountain States are included.

Claviceps purpurea (Fr.) Tul., ergot. Mich. (1).

Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. N. Dak. (1).

Corticium fuciforme (Berk.) Wakef., pink patch. Oreg. (2).

Helminthosporium sativum Pam. King & Bakke, root rot. N. Dak.

Ophiobolus graminis Sacc., root and stem rot. Ark. (1), Oreg. (2).

Ovularia pulchella (Ces.) Sacc., tan leaf spot. Oreg. (2).

Puccinia glumarum Cda. (II, III), crown rust.

P. graminis Pers. (II, III), stem rust. Kans. (1); Minn. (2); Calif., Oreg. (2, 3). The var. avenae Eriks. & Henn. identified.

Puccinia piperi Ricker (II, III), rust. Calif., Oreg. (3).

FESTUCA OCTOFLORA cont.

Rhizoctonia solani Kuehn, root rot, brown patch. N. Dak., Oreg.
Septoria festucae Died., leaf spot. S. Dak.
S. tenella Cke. & Ell., leaf spot. Colo., Kans., Mont., N. J., N. & S. Dak., Wash., Wyo. (1).
Tilletia festuca-octoflorana Zundel, seed smut. Mo.
T. fusca Ell. & Ev., seed smut. Ida., Mont., Nebr., Oreg., Wash., Wyo. (1); Wash. (3).
Uromyces hordeinus Arth. (II, III), rust. Miss., Tex. O and I on Nothoscordium bivalve.
U. jacksonii Arth. & Fromme (II, III), rust. Calif. (3).
Ustilago mulfordiana Ell. & Ev., head smut. Ariz., Colo., Ida., Mont., Utah, Wyo., (1); Oreg., Wash. (1, 3).

Bends, cause unknown. Wash. (3).

FESTUCA OVINA L., SHEEP FESCUE (1). Perennial occurring throughout the northern part of the temperate zone, in the U. S. forming a bunchgrass in the western mountains, especially the var. BRACHYPHYLLA (Schult.) Piper, ALPINE F. (2); at lower altitudes and in the East cult. as a pasture and lawn grass. The similar F. CAPILLATA Lam., HAIR F. (3), intr. from Europe, also is used in lawns.

Claviceps purpurea (Fr.) Tul., ergot. Mo. (On var. glauca (Lam.) Koch.).
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Minn. (1).
Erysiphe graminis DC., powdery mildew. Wash. (1).
Fusarium scirpi C. R. Lambert & Fautr. var. acuminatum (Ell. & Ev.) Wr., secondary root rot. N. Dak.
Helminthosporium sp., leaf spot. Md.
Hendersonia sp., leaf rot. Wyo. (2).
Heterodera marioni (Cornu) Goodey, root knot.
Marasmius sp. (? M. insititius Fr.), collar rot. Ind. (3).
Puccinia coronata Cda. (II, III), crown rust. N. Y.
P. crandallii Pam. & Hume (II, III), rust. Colo., N. Dak., Wash., Wyo. (1).
Rhizoctonia solani Kuehn, brown patch. General under cultivation.
Sclerotinia homoeocarpa F. T. Bennett, dollar patch, small brown patch. Specific reports on this host, with localities, are lacking, the disease sometimes not having been distinguished from ordinary brown patch and attributed to Rhizoctonia sp. This grass is susceptible and the disease occurs widely under cultivation in the North East and North Central States. Only the sterile stage has been found here.
Selenophoma donacis (Pass.) Sprague & A. G. Johns., speckle. Mont., Wash. (1, 2).
Septoria tenella Cke. & Ell., leaf spot. Wyo. (1).
Ustilago striaeformis (West.) Niessl, stripe smut. N. Dak., Oreg., Wash. (1).

Bends - cause unknown. Wash.

FESTUCA RUBRA L., RED FESCUE (1). Perennial, turf-forming grass of Eurasia, widely established in alpine and upland regions of both the Eastern and Western States, also commonly grown as a lawn grass in the North, for which the var. COMMUTATA Gaud., CHEWINGS F. (2) is preferred; the var. HETEROPHYLLA (Lam.) Mut., SHADE F. (3) is used in shady areas.

Anguina sp., infesting seed. Oreg. (2).
Aphanomyces sp., secondary root rot. N. Dak. (1).
Ascochyta graminicola Sacc., leaf spot. N. Dak., Oreg. (1, 2).
Cercosporella subulata Sprague, leaf spot. Oreg. (1).
Claviceps purpurea (Fr.) Tul., ergot. Minn., N. Y., N. Dak., Oreg. (1); Ky., Wash. (1, 2).
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Minn., Pa., Va. (1).
Corticium fuciforme (Berk.) Wakef., pink patch. Oreg. (2).
Erysiphe graminis DC., powdery mildew. Mich. (1), Oreg. (2).
Fusarium nivale (Fr.) Ces., snow mold. Mich., Minn., N. Y., Wis. (1).
Fusarium poae (Pk.) Wr., inflorescence blight, silver top. Pa. (1,2)
F. scirpi C. R. Lambert & Fautr. var. acuminatum (Ell. & Ev.) Wr., secondary root rot. N. Dak. (1, 2).
Helminthosporium sp., leaf spot. Va. (1).
H. sativum Pam. King & Bakke, root rot. N. Dak., Va. (1).
Hendersonia culmicola Sacc., leaf mold. Oreg. (1, 2).
Leptosphaeria ophiopogonis Sacc. var. graminum Sacc., on culms. Alaska (1).
Mycosphaerella tulasnei Jacz., leaf mold. Oreg. (1, 2).
Phaeoseptoria festucae Sprague, secondary leaf rot. Oreg.
Phyllachora graminis (Pers. ex Fr.) Tul., tar spot. Calif., Oreg. (1).
P. silvatica Sacc. & Speg., tar spot. Calif., Oreg. (1).
Pseudomonas coronafaciens (Elliott) Stapp var. atropurpurea (Reddy & Godkin) Stapp, chocolate spot. Wash. On var. lanuginosa Mert. & Koch.
Puccinia crandallii Pam. & Hume (II, III), leaf rust. Nev., Oreg., Wash., Wyo. (1).
P. graminis Pers. (II, III), stem rust. Calif., Wash. (1).
Pythium debaryanum Hesse, damping off. N. Dak. (1, 2).
Rhizoctonia solani Kuehn, brown patch. Cosmopolitan under cultivation (1, 2).
Sclerotinia homoeocarpa F. T. Bennett, dollar patch. See note on this disease under F. ovina.
Selenophoma donacis (Pass.) Sprague & A. G. Johns. var., speckle. Mont.
Septoria tenella Cke. & Ell., tan leaf spot. Oreg. (1, 2).

Bends - cause unknown. Wash.

FIMBRISTYLIS (CYPERACEAE)

FIMBRISTYLIS spp. Sedges inhabiting marshes and moist meadows mostly in the Eastern and Central States southward; of food value to wildlife.

Cintractia axicola (Berk.) Cornu, inflorescence smut. Ala., Del., Miss., Okla., Va., P. R. Mostly on F. autumnalis (L.) R. & S. in the U. S.
Puccinia fimbristylidis Arth. (II, III), rust. Tex., P. R. With Darluca filum (Biv.-Bern.) Cast., P. R. O and I unknown.
P. superius Arth. (II), rust. P. R. O and I unknown.
Septoria fimbristylis Ell. & Gall., leaf spot. Mo.
Stagonospora trimera (Cke.) Sacc.; on culms. ? N. J.

FLUMINEA (GRAMINEAE)

FLUMINEA FESTUCACEA (Willd.) Hitchc., RIVER GRASS. Tall perennial intr. from Europe, in marshy habitats in the North Central States and Oregon; used for hay.

Hendersonia trimera, Cke., ? N. J. = Stagonospora Sacc. ?
Piricularia grisea (Cke.) Sacc., gray leaf spot. N. Dak.
Puccinia coronata Cda. (II, III), crown rust. Mont., N. Y., N. & S. Dak.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Mont., N. Dak. Var. agropyrina (Eriks.) Arth.
Stagonospora arenaria Sacc., purple leaf spot. N. Dak.
Ustilago arthurii Hume, leaf smut. Oreg.

GASTRIDIUM (GRAMINEAE)

GASTRIDIUM VENTRICOSUM (Gouan) Schinz & Thell., NITGRASS. Annual, intr. from Europe, occurring in waste ground and a weed in cultivated fields, Oreg. to Tex.

Helminthosporium sp., leaf spot. Oreg.
Puccinia graminis Pers. (II, III), stem rust. Ariz.

GLYCERIA (GRAMINEAE)

GLYCERIA ELATA (Nash) Hitchc., TALL MANNA GRASS (1); G. GRANDIS S. Wats., AMERICAN M. (2); G. PAUCIFLORA Presl, WEAK M. (3); G. STRIATA (Lam.) Hitchc., FOWL M. (4). Tall (especially 1 and 2) perennials of moist habitats -- marshes, meadows, and woods. Nos. 1 and 3 occur in the Northwest from Alaska to Mont., N. Mex. and Calif.; 2 occurs throughout the Northern States, in the East from Me. to Tenn., and 3 extends to Fla. and Tex. and westward. All, where sufficiently abundant (especially 4), furnish forage for livestock, and food for wildlife.

GLYCERIA ELATA cont.

Claviceps purpurea (Fr.) Tul., ergot. Okla., Wash., Wis. (4).
Cylindrosporium glyceriae Ell. & Ev., leaf spot. Wis. (4).
Diplodina graminea Sacc., on culms. Tex. (4).
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail. Ga., Ill., Iowa, Md., Mich., Miss., Wis. (4).
Erysiphe graminis DC., powdery mildew. Mont. (4).
Ovularia pulchella (Ces.) Sacc., leaf spot. Wash. (1).
Puccinia coronata Cda. (II, III), crown rust. Calif. (1, 3), Ida. (4), N. Dak. (2), Oreg. (1, 3), Wash. (3).
P. graminis Pers. (II, III), stem rust. Calif. (1, 3), Ida. (3), Mo. (2), Mont. (3), Wis. (2).
Var. avenae identified.
P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Ind., Iowa, Minn., S. Dak. (2).
Var. agropyrina (Eriks.) Arth. with O and I on Ranunculaceae.
Sclerotium globuliferum J. J. Davis (reported as Burrillia globulifera Davis but found not to be a smut) on leaves and stems. Wis. (2).
S. rhizodes Auers., leaf rot. Wis. (4).
Scolecotrichum graminis Fckl., brown stripe. Ida., N. Dak. (2), Oreg. (2, 4), Wash. (1).
Septoria nodorum Berk., brown leaf spot. Ky. (4), Oreg. (1, 4), Wash. (3).
Stagonospora glyceriae Roum. & Fautr., leaf rot. Oreg. (4).
Ustilago arthurii Hume, leaf smut. Iowa (2).
U. longissima (Sow. ex Schlecht.) Meyen (U. glyceriae Cif.), leaf smut. Widespread (2); Oreg. (1), Pa., Utah (4).

GLYCERIA FLUITANS (L.) R. Br., MANNA GRASS (1); and G. SEPTENTRIONALIS Hitchc., EASTERN M. (2). Tall perennials growing in shallow water or wet soil, the former chiefly in the Northeast, the latter extending to S. Car., Tex. and Minn; furnish food for wildlife. A few records on other Glyceria spp., as noted, are included.

Claviceps purpurea (Fr.) Tul., ergot. Ind., Wis. (2).
Also on G. borealis (Nash) Batchelder in Ida., Me., Mich., Wis. C. microcephala (Wallr.) Tul., perhaps not distinct, reported on G. canadensis (Michx.) Trin. in Me.
Cylindrosporium glyceriae Ell. & Ev., leaf spot. On G. canadensis in Wis.
Entyloma spectabile Karst. (? E. crastophilum Sacc.), leaf smut. On G. pallida (Torr.) Trin. in Wis.
Epichloë typhina (Pers. ex Fr.) Tul., cat-tail. Mich., N. Y. (2).
Also on G. canadensis in Mich.
Fusarium heterosporum Nees, on ergot-infected inflorescences. Wis. (2).
Sclerotium globuliferum J. J. Davis, on leaves and stems. Wis. (2).
Scolecotrichum graminis Fckl., brown stripe. Mich., N. Y., Oreg., Wis. (1, 2).
Uromyces amphidymus Syd. (II, III), leaf rust. Ill., Ind., N. J., Wis. (2). On G. acutiflora Torr. in R. I. O and I unknown.

GLYCERIA FLUITANS cont.
Ustilago davisii Liro (U. longissima var. macrospora J. J. Davis), leaf smut. Me., Mich. (1); Ill., Me., Mich., Miss., Wis. (2).

GYMNOPOGON (GRAMINEAE)

GYMNOPOGON AMBIGUUS (Michx.) B. S. P., SKELETON GRASS. Low perennial occurring in open woods of the Coastal Plain and inland from N. J. to Fla. and Tex.; of food value to wildlife.

Dothichloë limitata Diehl, black ring, sterility disease. Ga., N. Car., Va.

HACKELOCHLOA (GRAMINEAE)

HACKELOCHLOA GRANULARIS (L.) Kuntze, PIT-SCALE GRASS. Annual occurring throughout the tropics, occurring in old fields in the Gulf States and the Southwest; of some forage value and furnishes food for wildlife.

Puccinia levis (Sacc. & Bizz.) Magn., rust. P. R. O and I unknown.

HETEROPOGON (GRAMINEAE)

HETEROPOGON CONTORTUS (L.) Beauv., TANGLEHEAD. Perennial of dry areas throughout the tropic zone; in the U. S. occurring sparingly from Tex. to Ariz., also in Hawaii; of value for forage and straw. H. MELANOCARPUS (Ell.) Benth., SWEET T. (2), an annual occurring in open woods and wastes in the Gulf States to Ariz., is without economic value.

Cerebella andropogonis Ces., on inflorescences associated with ergot. Ala. (1).
Helminthosporium sp., leaf spot. Fla. (2).
Puccinia versicolor Diet. & Holw. (II, III), rust. Hawaii. (1). O and I unknown.
Sorosporium contortum Griff., loose smut. Ariz., N. Mex. (1).
Sphacelotheca andropogonis (Opiz) Bub., covered smut. Ariz. (1).
S. monilifera (Ell. & Ev.) Clint., covered smut. Ariz., Hawaii (1).
S. nealii (Ell. & F. W. Anderson) Clint., covered smut. Fla. (2).

HIEROCHLOË (GRAMINEAE)

HIEROCHLOË ODORATA (L.) Beauv., SWEET GRASS (1). Perennial occurring in bogs and moist meadows in the Northern States from N. J. to Oreg. and northward to Alaska, also at high elevations in the Rocky Mountains; used in basketry and furnishes food for wild life. H. OCCIDENTALIS Buckl., CALIFORNIA S. (2) occurs near the coast, Calif. to Wash.

HIEROCHLOE ODORATA cont.

Asochyta graminicola Sacc., leaf spot. S. Dak., Wis. (1).
Helminthosporium sp., leaf blotch. Calif. (1).
Puccinia coronata Cda. (II, III), crown rust. N. Y., N. Dak. (1).
P. graminis Pers. (II, III), stem rust. Calif. (1, 2), Oreg. (2).
Var. avenae identified.
Septoria sp., leaf spot. Minn.

HILARIA (GRAMINEAE)

HILARIA BELANGERI (Steud.) Nash, CURLY MESQUITE (1); H. JAMESII (Torr.) Benth., GALLETA (2); H. MUTICA (Buckl.) Benth., TOBOSA GRASS (3); H. RIGIDA (Thurb.) Benth., BIG GALLETA. Perennials of arid plains and foothills in the Southwest; 1 and 3 are sod-forming and occur in southern Ariz. to central Tex., 2 and 4, erect and tuft-forming, range to Wyo., Utah and Calif. All are valuable for grazing and are efficient soil binders.

Claviceps cinerea Griff., ergot. Ariz. (1, 3); N. Mex., Okla., Tex. (3).
Fusarium scirpi C. R. Lambert & Fautr. var. accuminatum (Ell. & Ev.) Wr., secondary root rot. N. Dak. (2, 3).
Helminthosporium sp., leaf spot. Tex. (1).
Puccinia aristidae Tracy (II, III), rust. Ariz. (2), N. Mex. (2, 3), Nev. (4). O and I on many genera in various families.
Ustilago aegopogonis P. Henn., head smut. Ariz., Tex., (1).
U. affinis Ell. & Ev., head smut. Tex. (1).
U. hilariae Ell. & Tracy, head smut. Ariz. (3), Colo. (2), N. Mex. (2, 3).
U. hypodytes (Schlecht.) Fr., stem smut. Utah (2).

HOLCUS (GRAMINEAE)

HOLCUS LANATUS L., VELVET GRASS (1). Perennial of Europe, established in moist meadows and open ground throughout the Eastern and South Central States, also in the Pacific Coastal States and inland; cult. for forage and hay. H. MOLLIS L. (2), of similar origin and habit is found chiefly in the Pacific Coast States.

Ascochyta graminicola Sacc. var. holci Sacc., on leaves. Wash. (1).
Cercosporella holci Sprague, on leaves. Oreg., Wash. (1).
Claviceps purpurea (Fr.) Tul., ergot. Oreg., Wash. (1).
Colletotrichum graminicolum (Ces.) G. W. Wils., anthracnose. Ind., Md., Pa. (1).
Dilophospora alopecuri Fr., twist. Calif., Oreg. (1).
Entyloma crastophilum Sacc., leaf smut. Calif., Conn., N. Y. (1).
Fusarium nivale (Fr.) Ces., snow mold. Mich., Minn., Wis. (1).
Helminthosporium triseptatum Drechs., leaf spot. N. Y., Oreg., ? Mich. (1).
Mycosphaerella tulasnei Jacz., leaf mold. Wash.
Ophiobolus graminis Sacc., root rot. Oreg. (1).

HOLCUS LANATUS cont.

Ovularia pulchella (Ces.) Sacc., red spot. Oreg. (1).

Puccinia coronata Cda. (II, III), crown rust. Mass. to Ga. and Miss.; Oreg., Wash., Hawaii (1).

P. graminis Pers. (II, III), stem rust. Oreg. (1). Var. avenae Eriks. & Henn. identified.

P. rubigo-vera (DC.) Wint. (II, III), leaf rust. Mass., N. Y., N. Car., Va., Calif., Oreg., Wash. (1). The var. agropyri (Eriks.) Arth. is frequently cited, and the forma speciales holcina (Eriks.) Mains and triseti (Eriks.) Mains have been identified.

Rhizoctonia sp., white foot rot. Oreg. (1).

R. solani Kuehn, brown patch. Oreg. (1).

Septoria tritici Rob. ex Desm. forma holci Sprague, leaf blotch. Oreg. (1).

Tilletia holci (West.) Rostr., bunt. Mass., Pa., Oreg., Wash. (1).

Ustilago striaeformis (West.) Niessl, stripe smut. Oreg. (1).

DIVISION OF MYCOLOGY & DISEASE SURVEY

SPREAD OF WHITE PINE BLISTER RUST DURING 1944

J. F. Martin

The control of white pine blister rust [Cronartium ribicola] is conducted by the U. S. Department of Agriculture in cooperation with the affected States and other Federal agencies responsible for the administration of white pine forest lands, as one of the protective measures essential to the maintenance of the white pines in the forests of the United States. Every spring blister rust spores from diseased white pines are spread by air currents over wide areas. When they fall upon Ribes (currant and gooseberry plants) and find favorable conditions for germination and growth, they infect the leaves of these plants. Development of the disease on Ribes leaves, and the infection of nearby white pines, depends largely upon the weather. In some areas weather conditions are favorable during the sporulating seasons, and in others unfavorable, so each year local variations in spread and infection occur on both pine and Ribes. In 1941, for example, there was a southward extension of the rust on Ribes from central Virginia and West Virginia into northern Tennessee and North Carolina, a distance of about 134 miles, but as no resulting pine infection has been found, it appears the weather in that area was not favorable for the spread of the disease from Ribes to white pines during the late summer and fall. Natural invasion of new territory by this disease occurs on Ribes and always precedes its appearance on pines by a few years. However, over a period of several years favorable weather will at times coincide with the maturing spore stages on Ribes and cause pine infection, thus enabling the disease to advance slowly and become established in new areas.

White pine blister rust has been reported from 26 States, and occurs in more or less abundance in the principal white-pine-timber-producing areas in the Eastern and Western white pine regions and the northern half of the sugar pine region. The chief points of interest in connection with the spread of the rust in 1944 were the finding of infected white pines in [illegible]

new counties in northeastern Iowa, a 65-mile southward extension of the rust on Ribes in California, the discovery of infection on Ribes in Yellowstone National Park, and the finding of the disease on Pinus flexilis within its natural range.

In California blister rust was found in Yuba County on sugar pines and Ribes. The cankers on pines apparently originated in 1938. In addition, diseased Ribes were located for the first time in Placer, Eldorado, and Amador Counties. This extends the disease southward to the center of the sugar pine belt, a distance of about 65 miles from the previously known limit of spread. In the sugar pine areas of southern Oregon and northern California more infected Ribes and pines were observed than in any previous year, and Ribes sanguineum, in particular, was generally and heavily diseased. Many of the leaves were completely covered with telia. The leaves of Ribes bracteosum also were heavily infected with rust. During the spring and early summer the weather favored the infection of Ribes, but it was not so favorable for the infection of pines during the late summer and early fall. The amount of pine infection that may result from the heavy Ribes infection in 1944 will not be known until the rust has had a chance to become visible on the pines 3 to 4 years hence.

In Montana blister rust on Pinus flexilis was found in the vicinity of Two Medicine Lake, Glacier National Park. This infection is the first reported finding of the disease on pine in the Western States, east of the Continental Divide, and the first on P. flexilis within its natural range. The cankers were probably of 1937 origin. Also, the disease was found in Wyoming for the first time. It was located there on Ribes petiolare in the "Mammoth" area in the northwestern part of Yellowstone National Park.

The discovery of blister rust on natural white pine in Allamakee, Delaware, Howard, Clayton, and Winneshiek Counties, Iowa, was of particular interest because most of the pine in this State occurs as shelterbelts and small, scattered, natural or planted stands. On Ribes the disease was found for the first time in Cerro Gordo, Grundy, Hancock, Johnson, Jones, Kossuth, Muscatine, Scott, and Webster Counties. These findings increase the number of counties in Iowa from which infected white pines and diseased Ribes have been reported to 8 and 42, respectively. In addition, the rust was located on white pines for the first time in Arenac and Gladwin Counties, Michigan; Crawford and Greenlake Counties, Wisconsin; and Stearns and Clearwater Counties, Minnesota. In the latter State the disease also was found on Ribes in Stearns County for the first time.

The extension of the rust in the Southern Appalachian States was limited to Patrick County, Virginia, where it was found for the first time on Ribes.

In the Northeastern States blister rust is generally distributed on the white pines throughout their natural range. The amount of infection varies from a small percentage of diseased trees in some stands to nearly 100 percent in others. Many stands of timber contain a large number of dead and dying white pines as a result of long-standing infection that took place before the Ribes were removed. The disease occurs every year on Ribes during the spring, summer and fall, with the degree of infection varying from light to heavy, depending upon the prevalence of favorable weather for rust development. In the protected areas most of the smaller diseased trees have died and disappeared, and cankers resulting from recent infections are scarce. This is a complete reversal of the pine infection

situation that existed in these areas during the earlier years of the control program when young cankers on white pines were present in more or less abundance in nearly every stand. The absence of such cankers in protected areas is very largely the result of perseverance in Ribes eradication. Also, it is a good demonstration of the effectiveness of this work in establishing and maintaining control of the rust.

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

THE DODDER VECTOR OF WOODY PLANT VIRUSES

E. M. Hildebrand

Since Bennett's (1940) demonstration of virus transmission by the parasitic plant dodder (Cuscuta spp.), this new method of plant virus transmission has received the attention of a number of investigators (Johnson, 4,5; Kunkel, 6,7,8,9,10; Costa, 3; and Bennett, 2).

Studies were initiated by the writer late in 1940 in an attempt to transmit woody plant viruses to herbaceous plants because the latter are better suited for experimental purposes. With very few insect vectors known and grafting practically the only successful mode of transmission of woody plant viruses, the importance of testing the new dodder method of transmission was most inviting.

Preliminary studies employing 4 dodder species (Cuscuta subinclusa, C. californica, C. campestris, and C. repens) were successful for the transmission of cucumber mosaic virus from cucumber to cucumber but not from cucumber to peach. A minimum of 4 plants were used for each trial with each dodder species. Practically 100 percent transmission was obtained with C. subinclusa and C. campestris. However, one or more transmissions were obtained with the other two dodder species. Because of the facilities available, the possibility of some insect transmission was not excluded.

The attempt to transmit cucumber mosaic virus from cucumber to peach was made because of circumstantial evidence obtained by Dr. Charles Chupp on the apparent association in the field of severe outbreaks of cucumber mosaic in cucumbers and melons with those of yellow-red virosis on the choke cherry (Prunus virginiana).

In maintaining the different dodder species, none grew as well on peach as on beet, tomato, tobacco, and cucumber. After growth trials on peach over a period of three months it was finally decided to employ C. campestris for studies on the stone-fruit viruses.

In the early spring of 1941 a greenhouse transmission experiment was set up employing the yellow-red (X-disease), rosette, rosette-mosaic, mosaic, yellows, little peach, and red suture viruses. For each virus the dodder growth established on healthy peach seedlings was first trained to 2 diseased peach seedlings, next to 10 healthy tomato plants (about 8 inches tall), and then back to 2 or more healthy peach seedlings. The results on tomato were negative for all the viruses except for the yellow-red and rosette diseases. In the case of yellow-red virosis 7 of the tomatoes stopped growth at the end of about 3 weeks and then showed wilting followed by death in about 6 weeks. Practically identical symptoms occurred on 4 tomato plants in the rosette virus series. Because of unsuccessful transmission of these 2 viruses from tomato back to peach a second

experiment was repeated during the summer months with identical results. However, an infestation with red spider, while the writer was away from the laboratory for a week, obscured the results. One additional factor was introduced in the summer series, that of attempting graft transmission from tomato to tomato, but with negative results.

Several experiments were next tried for dodder transmission of the peach viruses from peach to peach, including the shading of the healthy plant after a dodder bridge was established. Although good dodder bridges were made in most cases, all the results were negative. The only report in the literature of dodder transmission of a woody plant virus from the herbaceous plant back to its native woody host was made in 1943 by Kunkel (7), who transmitted cranberry false blossom from tomato to cranberry.

Studies on dodder transmission were transferred over to George W. Cochran in 1943. He repeated and confirmed the above work on transmission of rosette virus from peach to tomato and Kunkel's (8) work on transmission of rosette from peach to periwinkle (Vinca rosea). Kunkel's (10) recent report on the transmission of virus from X-diseased peach trees to herbaceous plants, including tomato, confirms the writer's hitherto unpublished results. He likewise was unable to return this virus back to the woody plant by means of dodder or to complete Koch's Postulates as applied to virus transmission.

This note is being written for the express purpose of pointing out the limitations of the dodder method of transmission of woody plant viruses to herbaceous plants. The fact that in preliminary trials, dodder was also unsuccessfuly employed in work on cherry, plum, and currant viruses seems worthy of mention. In closing, it should be pointed out that finding new herbaceous hosts may be the key to progress in virus disease research with dodder.

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RESEARCH DEPARTMENT, FOOD MACHINERY CORPORATION.

CONDITION OF FRUITS AND VEGETABLES ON THE NEW YORK CITY PIERS

Robert C. Cassell

The material examined and recorded here was seen on the piers February 9th to 20th, and for the most part consisted of rail shipments. Apparently most produce on the New York market is being brought in by rail rather than by boat at the present time. The material examined was selected at random and no attempt was made to obtain an average loss of the produce received on the market. The amount of material received each day is too great and the time element was too short to be able to obtain accurate or representative figures of the over-all losses. Therefore, only those shipments are recorded in which disease conditions were found. In order to obtain correct loss percentages it would be necessary to work with a selected number of fruits and vegetables over a considerably greater length of time.

In general it appeared that where the produce had been selected and carefully packed by the producer the material arrived on the New York market in good condition. Several cars of Washington and Oregon apples were examined which were free from disease. In all cases the apples were individually wrapped. In limited examinations of cauliflower, cabbage, and carrots no disease was found. Most of the green peppers, spinach, celery, onions and string beans were also in good condition. At the present time tomatoes appeared to be the most severely affected although many lots were examined that were almost disease-free.

AVOCADO. One car of California avocados encountered was a total loss. The avocados were well packed in 20 pound boxes but apparently the car had experienced some difficulty in transit, possibly over-heating. The organisms involved in the rot of the fruits have not been completely determined to date but the following have been tentatively identified: anthracnose (Colletotrichum gloeosporioides), Pencillium sp., Aspergillus niger, and other Aspergillus spp.

GREEN BEANS. Ninety-six hampers of Florida grown Plentiful beans were seen that had become a complete loss because of 100% serious infection with watery soft rot (Sclerotinia sclerotiorum).

CELERY. A car of California Pascal celery was examined in which about 80% of the bunches were lightly to moderately affected with watery soft rot (Sclerotinia sp.). It was estimated that the loss in this car would amount to 5 or 10%.

PEARS. A car of Beuerre Hardy pears from California was found 68% seriously affected and 20% lightly affected by a firm type of rot. To date Rhizopus sp., probably R. nigricans, and blue-mold, Penicillium sp., have been isolated. Two other associated fungi have not yet been identified. Other shipments of Winter Nelis and Anjou pears from Oregon were in excellent condition.

GREEN PEPPERS. Only one lot of 42 bushel baskets of Virginia grown peppers was seen that appeared to be diseased. Seventy percent of the

peppers in this shipment had a light to moderate infection of bacterial spot (Xanthomonas vesicatoria).

POTATOES. Two cars of Maine potatoes were seen. One car was of the white round type, size B. The car had been regraded and put up in 50-pound paper bags in Boston. Only traces of Fusarium dry rot (Fusarium sp.), ringrot (Corynebacterium sepedonicum) and late blight (Phytophthora infestans) were found.

The other car was table stock of mixed varieties shipped directly from Maine in 100-pound bags. Net necrosis (leaf-roll virus) was the most conspicuous disease. It ranged from 2 to 3% in prevalence. Slight amounts of Fusarium dry rot and ringrot were also present.

PRICKLY PEARS. One shipment of 174 lugs (70 pears to a lug) of Blood Prickly pears from California was found where there was about a 75% loss. Sixty-eight percent of the fruits was seriously affected with blue-mold rot (Penicillium sp.), and about 7% with gray-mold rot (Botrytis sp.).

SPINACH. Two cars of Texas-grown spinach were observed with light to moderate infections of downy mildew (Peronospora effusa) and white rust (Albugo occidentalis) on the older leaves. The downy mildew was approximately twice as prevalent as the white rust.

TOMATOES. Table 1 includes those shipments of tomatoes in which any appreciable loss was found. In all cases counts of 25 to 50 tomatoes were made in each of 3 to 6 lugs.

Table 1. Disease condition of tomatoes on the New York City Piers. February 1945

Origin	Quantity[a]	Pack[b]	Percentage of fruit showing indicated maturity[c]		Percentage of disease-free and diseased fruits[d]			
					Disease-free	Diseased L	Diseased M	Diseased H
Florida	1 car	Loose	Green	32	26	24	37.5	12.5
			Prt. ripe	20	60	20	20	0
			Ripe	48	25	25	34	16
Cuba	1 car	Wrap	Green	22	100	0	0	0
			Prt. ripe	39	100	0	0	0
			Ripe	39	57	14	29	0
Cuba	1 car	Wrap	Green	38	100	0	0	0
			Prt. ripe	51	99	0	1	0
			Ripe	11	100	0	0	0
Cuba	1 car	Wrap	Green	42	72	28	0	0
			Prt. ripe	17	100	0	0	0
			Ripe	41	86	14	0	0
Florida	1 car	Loose	Green	67	55	45	0	0
			Prt. ripe	23	0	0	100	0
			Ripe	10	34	0	33	33
Cuba	25 lugs	Wrap	Green	35	100	0	0	0
			Prt. ripe	38	100	0	0	0
			Ripe	27	98	0	0	2
Florida	563 lugs	Loose	Green	72	48	14	12	26
			Prt. ripe	24	23	26	37	14
			Ripe	4	50	0	25	25

For footnotes see top of next page.

Footnotes for Table 1.

[a] Approximately 700 lugs make a car shipment.
[b] All fruits in wooden boxes (lugs) either loose pack or individually wrapped.
[c] All fruits classified as to green, partially ripe, or ripe condition.
[d] Severity light (L) = one small, or up to 3 or 4 very small infection areas.
Severity moderate (M) = one large, or more smaller infection areas.
Severity heavy (H) = one very large, or more large infection areas.

Time was not available for cultural identification of most organisms involved but valuable aid in macroscopic identification was rendered by Dr. C. O. Bratley and Dr. James S. Wiant of the New York City Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, Soils and Agricultural Engineering. Diseases present and their relative proportions did not seem to differ appreciably from what was found last year on the Boston market (PDR, 28:(9): 347, Apr. 15, 1944). Fruit spot (Alternaria sp.), was the most prevalent disease and Phoma rot (Phoma destructiva) was next in importance. Some blossom-end rot (physiogenic) was seen and possibly species of Botrytis, Ramularia, and other organisms.
EMERGENCY PLANT DISEASE PREVENTION PROJECT.

POTATO STORAGE TROUBLES IN SOUTH DAKOTA

Ian W. Tervet

During the week of February 5-9, 1945, potatoes were inspected in Deuel, Codington, and Clark Counties. The writer was accompanied during part of the inspection by W. F. Buchholtz of South Dakota State College.

Very little late blight (Phytophthora infestans) was seen during the growing season in South Dakota, and very few infected tubers were seen in storage. Highest infection, amounting to about 0.1%, was seen in potatoes grown in Deuel County. Infection at Watertown was a trace, while in Clark County only a very few tubers infected with late blight have been found.

Scab (Actinomyces scabies) was found in all storage houses, some lots being heavily infected. While scab appears to be somewhat less injurious in the 1944 crop than in that of 1943, this disease is the cause of greatest loss to the growers. Black scurf (Pellicularia filamentosa) was common but not sufficiently serious to be of much importance.

Bacterial ringrot (Corynebacterium sepedonicum) has been found in a few cars of seed shipped from Clark and Codington Counties to southern States. Examination of potatoes still in storage did not disclose any further lots to be infected and no infected tubers were found in pick-outs. Ringrot was seen in a few fields during the growing season: tubers from these fields had been shipped early. While little ringrot occurs in South Dakota at the present time, there is ample opportunity for it to become more widespread. The larger growers, county agents, and seed inspection officials are fully aware of the potential dangers involved and are endeavouring to develop a program to minimize chances of additional infections.

Hair sprout was seen in Triumphs, while some rubbery tubers, indicative of infection by purple top wilt [virus], also were found.
EMERGENCY PLANT DISEASE PREVENTION PROJECT.

DISEASES REPORTED ON TOBACCO AND SUGAR BEETS

Except where noted reports are of Emergency Plant Disease Prevention Project surveys.

TOBACCO DOWNY MILDEW IN GEORGIA: Blue mold [downy mildew, Peronospora tabacina] was observed Saturday, February 24th, in Irwin County. The disease had been reported all during the week of February 19th to 24th in Cook and Berrien Counties, the earliest observance by a County Agent being reported February 18th. In one new bed in Irwin County the disease was observed February 24th. This new bed was about 125 feet from an old bed location and on higher ground. No sign of living tobacco plants could be found in this old location. However, blue mold was reported (by a farmer) in an old bed about 5 miles away a few days earlier. There is some doubt as to just how the disease got started in this new bed so early. In one other year, about 10 years ago, we noticed the disease in a new bed under similar circumstances. -- George G. Gaines, Division of Tobacco Investigations. Feb. 26.

TOBACCO SEEDLING DISEASES IN LOUISIANA: Perique tobacco seedlings are well along in the coldframes in the Grande Pointe area of St. Martin Parish. Size of the plants varies from the cotyledonary stage to nearly 6 inches. A combination of leaf spot and damping-off was responsible for loss estimated at 25% and 50%, respectively, in 2 coldframes. The leaf spot, or blight, appeared to be more prevalent than damping-off but in many instances both diseases attacked the same plants. The leaf spot was found on small plants, particularly on leaves closest to the soil. The sunken white spots were circular, or semicircular on the leaf margins, and averaged about 3 mm in diameter. In many instances the necrotic areas had dropped out, thus producing a shot-hole effect. Often entire leaves and plants were rotted. Microscopic examination showed that the necrotic areas were densely packed with hyphae of a species of Rhizoctonia. Bacteria were also present in the dead tissue. Roots and leaves have been cultured.

Blue mold or downy mildew has not been seen in any of the coldframes examined. -- Douglas C. Bain, Feb. 5-17.

DISEASES ON SUGAR BEETS IN THE IMPERIAL VALLEY OF CALIFORNIA: Several large plantings were inspected. Near Brawley a trace of leaf spot caused by Phoma betae was found in 2 fields. A trace of curly top (virus) was noted in most of the fields visited in the vicinities of Calexico, Imperial, Heber, and El Centro. -- E. W. Bodine, Jan. 23-27.

PEA DISEASES IN THE IMPERIAL VALLEY OF CALIFORNIA

William C. Snyder, John T. Middleton, and E. W. Bodine

Garden peas for market have been grown successfully as a winter crop near the California-Mexico border in the Imperial Valley for at least 25 years. Because of the peculiarities of climate in this California desert, namely mild winter temperatures, low winter rainfall, and low atmospheric humidities, the pathology of the crop as it is grown there becomes of special interest.

Surveys for pea diseases were conducted in the Imperial Valley during the 1943-44 and 1944-45 winter seasons. Field inspections were made by the writers jointly on January 12 and 13, 1944, and on January 25 and 26, 1945, at both of which times the effort was made to obtain as representative a cross section of the crop as possible. Most of the plantings were found in the Niland district. In addition, fields were examined separately by the writers at intervals throughout both pea seasons. Plants showing symptoms on below-ground parts were taken to the laboratory for diagnosis. Varieties commonly found in the Imperial Valley included Hundredfold, #60, #40, Giant Stride, and Laxtons Progress.

Diseases Found

Fusarium root rot, caused by F. solani f. pisi. -- This root rot was the most prevalent and most destructive disease of peas observed during the 2 seasons of the survey. The underground stem and roots of affected plants became dark brown to black in color and the fungus frequently was found to have girdled the plant and gained entrance to the vascular tissue, where it produced a reddish discoloration which at times extended a short distance upwards into the above-ground stem. Severely infected plants became severed in the region of the cotyledons, turned yellow and later died. The disease was at its worst in fields which had been continuously in peas, but even fields in their 15th consecutive year apparently were still producing fair pea crops. Where crop rotation had been practised there was noticeably less root rot. Most fields which had a previous pea history showed light or moderate infection, while on the oldest pea land the disease was occasionally severe.

Rhizoctonia root rot, caused by Rhizoctonia solani. -- Perhaps next in importance to Fusarium root rot was the Rhizoctonia disease. This root and stem rot was more common in the early and later parts of the growing season than during mid-winter. In general the damage caused by Rhizoctonia root rot was light and of minor importance in 1943-44 and 1944-45.

Fusarium near-wilt, caused by F. oxysporum f. pisi race 2. -- Near-wilt was found both seasons. It occurred in trace amounts in 2 fields, while in a third field, which was one of the oldest in the district in point of pea culture, 5 to 10% of the plants were affected. Symptoms, including the common unilateral expression of disease, began to appear in the spring crops about the middle of January, at the time of blossoming, and the percentage of infected plants increased from then on through harvest.

Scab, caused by Cladosporium pisicola. -- Scab has been found in the fall crop harvested in November and December, but was not noted in the spring crop. It has been observed occasionally to affect the marketability of peas through blemishes produced on the pods, but ordinarily it has

been of minor importance in the area.

Miscellaneous diseases. -- Seed rot and poor stands have been observed frequently. It is believed that a more general use of seed treatments would be beneficial in this regard. Frost damage was common in the 1943-44 season, when the foliage of some plants was injured and many pods blistered. Frost was of no consequence in the succeeding season. Pythium spp. were found associated with root rot in some fields, but it is not known to what extent they were involved as pathogens since the Fusarium or Rhizoctonia root rots (described above) were also present in these cases. Salt injury was observed in varying degrees, from slight yellowing of tops to the killing of plants in circular areas of varying size. A trace of mosaic (virus) was seen (2 plants) in January, 1945, but none was observed the previous season although aphids were found in numbers in some fields. Powdery mildew (Erysiphe polygoni) was occasionally seen in the fall crop near the conclusion of harvest, and some growers sulfur both fall and spring crops for protection against this disease. Very little powdery mildew was found in the 1943-44 and 1944-45 seasons. A few plants infected with downy mildew (Peronospora viciae) were found in February, 1945, but other than this the disease was not encountered.

Diseases not found

Although Ascochyta blight (A. pinodes, A. pinodella, A. pisi) was sought for on both above-ground and below-ground parts, none was found during either season. Nor were Septoria blotch (Septoria pisi), bacterial blight (Bacterium [Pseudomonas] pisi), or anthracnose (Colletotrichum pisi) found. Virus diseases were almost lacking, although a trace of mosaic was found in 1945 in one planting. No common wilt (Fusarium oxysporum f. pisi race 1) was encountered.

Discussion

It is evident from this survey that the conditions existing in the Imperial Valley have favored certain root rot diseases of peas, especially that caused by F. solani f. pisi. Root rot, salt injury, and frost damage constituted the principal hazards to pea culture observed in the Valley during the last 2 seasons. It is also evident that foliage diseases, especially those dependent upon rainfall, were mostly lacking. The wet-weather seed-borne diseases of peas of most importance in the United States, such as Ascochyta and bacterial blights, were not found at all.

Since peas have been grown in the area for more than 25 years, and in some fields for 10 to 15 consecutive seasons, it is believed that the absence of seed-borne fungus and bacterial blights is strong evidence that the climatic conditions peculiar to the Imperial Valley, particularly the low winter rainfall, are unsuited to their development or establishment. The average rainfall at Brawley for the 5-month fall period, August through December, totals 1.19 inches, while that for the corresponding spring period, November through March, totals 1.64 inches. The annual rainfall at Brawley is 2.43 inches.

In view of the absence of the seed-borne blights in market pea crops there, it is suggested that the Imperial Valley offers an unusual possibility for the growing of seed peas free from such diseases.

DIVISION OF PLANT PATHOLOGY, UNIVERSITY OF CALIFORNIA, BERKELEY AND RIVERSIDE, and EMERGENCY PLANT DISEASE PREVENTION PROJECT.